

VPDES PERMIT FACT SHEET

This document gives the pertinent information concerning the revocation and reissuance of the VPDES permit listed below. This permit is being processed as a **major industrial** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

The discharge results from the manufacturing of synthetic iron oxide pigments. Discharges to outfall 001 consists noncontact cooling water and process water from the manufacture of magnetic media. Storm water associated with industrial activity is discharged through outfalls 002, 003, and 004. This permit action consists of revising the zinc maximum daily average limit, adding ammonia monitoring, requiring a study to provide additional whole effluent toxicity data, and updating the special conditions.
(SIC Code: 2816 Inorganic Pigments)

1. **Facility Name and Address:**

Nanochemonics Holdings, LLC (formerly Magnox Speciality Products)

1 Magnox Drive

Pulaski, Virginia 24301

Location: 4 Magnox Drive

2. **Permit No.** VA0000281 Existing Permit Expiration Date: July 9, 2009

3. **Owner/ Facility Contacts:**

Carmine DiNitto, Vice President, (540) 980-9409, cdinitto@nanochemonics.com

Kenneth D. Lore, Environmental and Quality Manager, (540) 980-3500, ext 445,
klore@nanochemonics.com

4. **Application Complete Date:** February 6, 2008 (Revised 5/15/08)

Permit Drafted By: Becky L. France

Date: May 27, 2008 (Revised 9/3/08, 10/16/08, 10/29/08)

DEQ Regional Office: West Central Regional Office

Reviewer: Kip D. Foster, Water Permit Manager

Reviewer's Signature: [Signature] Date: 11-5-08

Public Comment Period Dates: From _____ To _____

5. **Receiving Stream Classification:**

Receiving Stream: Peak Creek (River Mile: 10.99 - Outfall 001)

Watershed ID: VAW-N17R

River Basin: New River

River Subbasin: NA

Section: 2

Class: IV

Special Standards: v, NEW-5

7-Day, 10-Year Low Flow: 0 MGD

7-Day, 10-Year High Flow: 0 MGD

1-Day, 10-Year Low Flow: 0 MGD

1-Day, 10-Year High Flow: 0 MGD

30-Day, 5-Year Low Flow: 0 MGD

Harmonic Mean Flow: 0 MGD

Tidal: No

303(d) Listed: Yes

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements:** None
7. **Reliability Class:** NA
8. **Permit Characterization:**
 (X) Private () Interim Limits in Other Document
 () Federal () Possible Interstate Effect
 () State
 () POTW
9. **Treatment Provided:** A description of the wastewater treatment system is provided below. See **Attachment B** for the water flow diagrams and **Attachment C** for the site inspection report. **Table I** below includes the treatment units and flow associated with the discharge.

Table I
DISCHARGE DESCRIPTION

Outfall Number/ Location	Discharge Source/ Drainage Area	Treatment (Unit by Unit)	Flow (Max 30-day Average) (MGD)
001 37°2'52" 80°47'33"	Magnetic Iron Oxide Plant Cobalt Adsorption Plant Magnetite Plant miscellaneous flows	pH adjustment flocculation sedimentation	0.93
901 37°2'52" 80°47'33"	process water and storm water from west plant area including ferrous sulfate storage area (165,700 sq ft) (78,000 sq ft impervious)	pH adjustment flocculation sedimentation	NA
002 37°2'47" 80°47'20"	storm water from roof drainage and surface water runoff east of Peak Creek (7,800 sq ft)	no treatment	NA
003 37°2'47" 80°47'18"	storm water from roof drainage and surface water runoff east of Peak Creek (13,000 sq ft)	no treatment	NA
004 37°2'47" 80°47'16"	storm water from roof drainage and surface water runoff east of Peak Creek (15,000 sq ft)	no treatment	NA

Nanochemonics produces synthetic iron oxide pigments for use in video recording (VHS tape) and MICR (magnetic ink character recognition). Iron oxide pigments are also produced for cosmetics, coatings and stains, and high speed printers and copying. The raw materials include the following main constituents: ferrous sulfate (copperas), caustic soda, powdered metallic iron, and water. In addition, lesser amounts of cobalt sulfate, phosphoric acid, sulfuric acid, and small amounts of sodium chloride are used. Nanochemonics recycles caustic waste into the process. According to the 2008 VPDES permit application information, the production of high sulfate generating product has been reduced significantly.

Nanochemonics pretreatment permit issued through the Town of Pulaski expired on January 4, 2008. Under this permit, high sulfate wastewater from the magnetic iron oxide plant and cobalt absorption plant was routed through the Town's sanitary sewer to the Peppers Ferry WWTP. In the fall of 2007, Nanochemonics stopped routing high sulfate wastewater to the onsite process pretreatment wastewater treatment system. The permit is being modified to recharacterize the wastewater and evaluate the effectiveness of the effluent limitations in protecting water quality of the receiving stream. Since the permit will expire on July 9, 2009, the permit is being revoked and reissued. The VPDES permit application indicates that the facility will continue to have the ability to produce magnetic oxides using three process lines.

The three basic processes include: (1) Magnetic Iron Oxide (MIO) Process which precipitates ferric hydroxide (yellow goethite) for calcination to magnetic ferric/ferrous oxides; (2) Cobalt Adsorption (CA) Process which uses the precursor from MIO as a raw material and involves precipitation, surface treatment, filtration, annealing, and blending, and; (3) the Magnetite Process, which is a similar process as MIO with different reaction conditions (the calcination process is not used in this process). Certain product lines from the MIO process are surface treated with cobalt in an intermediate process called the HIEN process. The table below shows that the production from the Magnetic Oxide (MIO) process and the Magnetite process has declined significantly from the previous permit term. A more detailed process summary is found in the **Attachment C**.

Average Wastewater Generation Rates

Process	1998	2003		2007
	Flow to Outfall	Total Production Flow	Flow to POTW	Flow to Outfall
Magnetic Iron Oxide (MIO)	401 gpm	318 gpm	55 gpm	175 gpm
Cobalt Absorption (CA)	120 gpm	110 gpm	0 gpm	110 gpm
Magnetite	56 gpm	40 gpm	20 gpm	10 gpm

Process	1998	2003		2007
	Flow to Outfall	Total Production Flow	Flow to POTW	Flow to Outfall
Miscellaneous	18 gpm	15 gpm	0 gpm	15 gpm
Total Average Plant Flow	595 gpm (0.84 MGD)	483 gpm (0.70 MGD)		310 gpm (0.45 MGD)

Wastewater Treatment

The process water including any unused caustic recycle water is routed to the wastewater treatment system which consists of the following: pretreatment, sedimentation, carbon dioxide reacidification, and sludge drying.

Precipitation: Lime slurry is added to the waste stream as it enters the main treatment basin. An agitator provides mixing. The pH is maintained at 10.8 - 11.4 S.U. to insolubilize the metal ions present in the waste stream so that they may be removed by sedimentation in the ponds. Also, a minimum effluent hardness of 95 mg/L is maintained by adding a small constant amount of lime. Once the pH has been stabilized in the pH adjustment pit, anionic polymer (Selfloc 2140B) is delivered to the effluent ditch downstream of the pH adjustment pit. After the flocculent is added to the wastewater stream, the wastewater is gravity fed through a 1- inch ditch to a concrete basin covered with grating for inspection.

Sedimentation: Wastewater exits via a ditch to either No. 4 or No. 3 clay lined pond to separate precipitated solids (iron oxides, iron hydroxides, calcium sulfate, and cobalt) from the wastewater. The wastewater flows in series through the three or two remaining lagoons (No. 3 to No. 2 to No. 1) depending on whether a lagoon is being serviced. The clear water from Pond No. 1 then spills into a weir box where flow is measured and then discharged into Peak Creek. Flow is measured with a v-notch weir with mechanical scale and pressure sensor with continuous recording.

Carbon Dioxide Reacidification: Final pH is controlled by carbon dioxide addition prior to discharge from Pond No. 1. Wastewater leaving each of the 4 ponds is continuously monitored for pH. If the wastewater pH is below 6.0 S.U. at the channel between Pond No. 2 and Pond No. 1, soda ash can be added to raise the effluent pH. In order to adjust the pH to between permit limits, carbon dioxide is added by a series of diffusers within the pipe that carries the effluent from Pond No. 2 to Pond No. 1. Carbon dioxide is supplied by a 30-ton storage tank and four backup cylinders located at the foot bridge across Peak Creek. Sulfuric acid is available for emergencies.

Sludge Drying: The old drying beds have been replaced by an approved clay lined drying bed (No. 1). Periodically, settled precipitate of approximately 5 percent solids from the ponds is pumped into Drying Bed No. 1. This material is registered as SOILEX[®], an intermediate cover

for sanitary landfills. Excess water percolates through an ash bed into a drain tile field bed to expedite the evaporative drying process. Drainage from the Drying Bed No. 1 discharges back to Pond No. 4. Periodically, the Soilex^R is removed from the facility to an approved landfill or sold to an approved buyer. The facility's Sludge Management Plan was approved on December 21, 1998.

Outfalls

Outfall 001

Treated process water from the MIO, CA, and magnetite plant production processes and storm water are discharged into this outfall. The effluent is discharged from Pond No.1 into Peak Creek. Noncontact cooling water used in the MIO conversion process to cool the mullers, kiln, and air compressors is recovered for use in the filtration processes. No chemicals are added to the cooling water. Any overflow from the cooling water storage tanks is released into outfall 001.

Outfall 901

Outfalls 901 and 001 are the same, but monitoring requirements for outfall 901 apply only during a measurable storm event as defined on Part I.A of the permit. Storm water from the plant area west of Peak Creek is collected by berms and trenches and directed to the treatment facility to be ultimately discharged through the plant's permitted wastewater outfall (storm water discharge 901). This outfall receives runoff from ferrous sulfate (copperas) stored in the area. Water drained from the secondary containment around a no. 2 fuel oil tank is also discharged into the wastewater treatment facility.

Sodium hydroxide is unloaded from the rail cars in an area exposed to precipitation. A sump is located under the railroad track where the unloading takes place. If a spill occurs in this area it would be captured by the sump and directed to the plant wastewater treatment facility where the pH may be adjusted.

Outfalls 002, 003, 004, 555

Waste solvents are stored in an area on the east side of the facility and are located on a curbed concrete structure to prevent any release. Surface runoff and roof drainage from the areas east of Peak Creek are collected in a series of underground drains which discharge into Peak Creek through outfalls 002, 003, and 004. Particulate iron oxides collected on the building roof and surrounding areas from dust control equipment, spill material, and vehicular traffic are washed into the storm water of all three outfalls. These outfalls have been designated in a previous permit and the permit application as substantially identical. See **Attachment D** for a copy of the State Water Control Board approval letter identifying outfalls 002, 003, and 004 as substantially identical. Outfall 555 has been added to allow the calculation of annual copper and zinc loading limitations from average storm water discharges from 002, 003, 004, and 901.

10. **Sewage Sludge Use or Disposal:** Domestic sewage sludge is not produced at this facility.

11. **Discharge Location Description:** The USGS topographic map which indicate the discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment B**. The latitude and longitude of the discharge from outfall 001 are N 37°2'50" and E 80°47'30", respectively.

Name of Topo: Pulaski Number: 083D

12. **Material Storage:** The facility is conditionally exempt from hazardous waste permitting. Small quantities of waste solvents (F category) are stored on the east side of the facility in double contained drums. The drums are surrounded by a concrete structure with curbing to prevent any release. A list of chemicals stored onsite is included in the **Attachment C**.

All SARA Section 313 reported pollutants are stored and unloaded inside areas that are covered thus eliminating the potential for these compounds to come into contact with rainfall. All the process chemicals except ferrous sulfate are stored inside. Ferrous sulfate is partially covered. Drainage from the ferrous sulfate storage area is collected in a sump where the runoff is recovered, treated, and ultimately discharged through the process outfall.

The following is a list of external tanks:

Tank ID	Tank Capacity (gallons)	Tank Contents	Storage Facilities
AST	24,950 gallon tank	#2 Fuel Oil	Under shelter
AST	15 tons	Liquid Nitrogen	
AST	15 tons	Liquid Oxygen	
AST	30 tons	Liquid carbon dioxide	

13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, STORET data, unauthorized discharges, and any other biological and/or chemical data, etc.) are listed below.

A. **Instream Flow**

The current permit has a 7Q10 of 0 MGD. This number is based upon the fact that the water withdrawals from the Town of Pulaski and Nanochemonics could use all of the available flow in the stream during low flow conditions. Nanochemonics' permit has a special condition requiring them to implement a contingency plan once the flow drops below 1.5 MGD. This plan is designed to maintain an instream waste concentration (IWC) of 45 percent. The Whole Effluent Toxicity (WET) limit is derived from this 45 percent IWC. See **Attachment A** for the Flow Contingency Plan. Using 45 percent for the IWC and the lowest instream flow during the permit term (1.09 MGD), an effluent flow of 0.892 MGD was calculated. This effluent flow was used in the WLA spreadsheet to simulate the instream waste concentration and potential stream characteristics when the permittee is implementing the contingency plan.

B. Unauthorized Discharges

During the current permit term there were two unauthorized discharges reported by the permittee. On September 5, 2005 there was a small discharge of untreated industrial wastewater directly to Peak Creek. On May 5, 2006 there was a discharge of approximately 50 to 100 gallons of wash water with lime and sodium released to Peak Creek. The pH of the creek was measured at 7.0 S.U. and there was no visible color or solids from this unauthorized discharge.

C. Background Stream Data

Data from STORET Station 9-PKC011.11 were used to evaluate the background pH, temperature, and hardness instream data used in this Fact Sheet. The STORET station is located upstream of the Nanochemonics outfalls at the Route 610 bridge on Commerce Street in Pulaski. The data can be found in **Attachment E**.

D. Special Water Quality Studies:

“Third Annual Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Nanochemonics Pulaski Inc.,” dated September 2007

“Second Annual Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of the Magnox Facility,” dated August 2006

“First Annual Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Specialty Pigments, Inc.,” dated October 2005

“Fecal Bacteria and General Standard Total Maximum Daily Load Development for Peak Creek,” DEQ, 2004

“Annual Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Incorporated, VPDES Permit No. VA0000281,” dated February 7, 2003

“Annual Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Pulaski Inc.,” dated March 26, 2002

“Annual (2000) Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Inc.,” dated February 8, 2001

“Annual (1999) Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Inc.,” dated March 21, 1999

“Annual (2002) Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Inc.,” dated February 7, 2003

“Annual (1998) Benthic Macroinvertebrate Survey of Peak Creek in the Vicinity of Magnox Pulaski Inc.,” dated February 2, 1999

“Instream Impact Study – (1992 Benthic Macroinvertebrate Survey), dated May 8, 1992

“Instream Impact Study – (1992 Toxicity Testing),” dated February 10, 1992

Summary tables excerpted from the annual benthic macroinvertebrates studies and copies of annual benthic review memorandums are found in **Attachment F**. The study results during the permit term indicate moderate impairment downstream from the discharge. The annual benthic surveys conducted during the permit term indicate a reduction of total taxa, especially those in the EPT (mayfly, stonefly, and caddisfly) orders. There was also a severe reduction in the 2004 survey to complete absence in 2006 and 2007 surveys of the pollution sensitive mayfly order. The downstream stations have higher percentages of the caddisfly family than the reference station. The caddisfly family is typically dominant in streams impacted by excessive nutrients and organic waste. There is no evidence of improvement in the downstream benthic community over the course of the permit term.

Nanochemonics has one process outfall which discharges to the Peak Creek Watershed (VAW-N17R) as described in the Integrated 2004 Water Quality Assessment and 2006 Impaired Waters Fact Sheet (**Attachment E**). This segment of Peak Creek is listed on Part I of the 303(d) list due to exceedances of the fecal coliform criteria, sediment metal values, PCBs in fish tissue, and impairment of the benthic community.

14. **Antidegradation Review and Comments:** Tier I X Tier II Tier III

The State Water Control Board’s Water Quality Standards include an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. Peak Creek is not listed as a public water supply in the segment where the discharge is located. Peak Creek in this segment (VAW-N17R) is listed on Part I of the 303(d) list for benthic impairment, PCBs in fish tissue, exceedances of the fecal coliform criteria, and sediment metal values. Toxicity testing data and benthic biomonitoring data indicate toxicity problems. For further details refer to **Attachment F** for an antidegradation discussion from the 1994 Permit Fact Sheet. Therefore, this segment of the New River is classified as a Tier I water, and existing uses of the water body and the water quality to protect these uses must be maintained. Any limitations to be developed for this permit will be developed in accordance with Section 303(d)(4) of the Clean Water Act.

Effluent and stream data used to determine average hardness and 90th percentile pH and temperature values for the wasteload allocation spreadsheet are included in **Attachment D** and **Attachment E**, respectively. The permit limits are established by determining wasteload allocations that will result in attaining and/or maintaining all water quality criteria that apply. The WLAs will provide for the protection and maintenance of all existing uses. See **Attachment G** for the wasteload allocation spreadsheet. The permit limits are in compliance with antidegradation requirements set forth in 9 VAC 25-260-30. The antidegradation review was conducted as described in Guidance Memorandum 00-2011, and complies with the antidegradation policy contained in Virginia's Water Quality Standards.

15. **Site Inspection:** Date: 2/27/07

Performed by: Lynn V. Wise, Kip Foster, Becky L. France, Lewis Pillis

Attachment C contains a copy of the site inspection report. The last technical / laboratory inspection was conducted by Gerald Duff on October 13, 2006. A copy of the inspection report is found in the DEQ inspection file.

16. **Effluent Screening and Limitation Development:** DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq). Effluent and instream data used in the calculation of the 90th percentile value for temperature, pH, and average hardness are included in **Attachment D** and **Attachment E**. Refer to **Attachment G** for the wasteload allocation (WLA) spreadsheet and effluent limit calculations. See **Table II** on pages 26-28 for a summary of effluent limits and monitoring requirements.

In accordance with the Storm Water General Permit Regulation, 9 VAC 25-151-10 et seq., the industrial sector specific monitoring requirements and a Storm Water Pollution Prevention Plan (SWPPP) has been required for this facility. In cases where representative storm water data indicate conclusively that a parameter is not present in the storm water runoff above the monitoring cutoff concentration, then further monitoring may not be required for that parameter.

The need for additional analytical monitoring of storm water discharges has been evaluated against decision criteria. The decision criteria are not effluent limits, but provide comparative criteria for evaluating the effectiveness of installed best management practices. Decision criteria are established at either 1) two times the acute water quality criteria, or 2) the DEQ storm water benchmark levels, whichever is more stringent. Monitoring is required where data are reported for a specific pollutant in concentrations that meet or exceed decision criteria. Annual monitoring is required for all parameters exceeding the DEQ benchmark levels. Quarterly monitoring is required when data reported for a specific pollutant meet or exceed two times the acute criteria. A summary of storm water monitoring data required during the permit term has been included in **Attachment D**.

The storm water monitoring data shall be used as a tool to tailor the SWPPP to the site. The Plan should address identifying sources of the pollutants and initiate procedures to reduce any pollutants at or above the decision criteria. The effectiveness of the SWPPP will be measured

against these criteria for the parameters. If the concentration of the pollutants in the discharge remains below the decision criteria it is assumed the SWPPP is effective. Decision criteria for each of the storm water monitoring parameters are listed below:

Pollutant of Concern	Decision Criterion	Basis for Criterion
Aluminum, Total Recoverable	750 µg/L	DEQ benchmark
Iron, Total Recoverable	1 mg/L	DEQ benchmark
Nitrogen, Total	2.2 mg/L	DEQ benchmark
Copper, Dissolved	18 µg/L	DEQ benchmark*
Zinc, Dissolved	120 µg/L	DEQ benchmark*

*Notes: DEQ benchmark for zinc more stringent than storm water criteria of 280 µg/L for zinc. DEQ benchmark for copper more stringent than storm water criteria of 34 µg/L for copper. Benchmarks are based upon hardness of 100 mg/L.

A. **Mixing Zone**

The MIXER Program was run to determine the percentage of the receiving stream flow to be used when calculating the wasteload allocations (WLAs). The permit requires an instream waste concentration (IWC) of not greater than 45 percent. When the stream flow drops below 1.5 MGD, the permittee take measure to reduce the IWC to below 45 percent. During the current permit term the lowest daily stream flow recorded was 1.09 MGD. Given an IWC of 45 percent and this value, the effluent would be calculated to be 0.892 MGD. The MIXER program was run to determine the percentage of effluent expected to mix with the stream during these low flow conditions. The program output indicated that 100 percent of the 7Q10 and 6.89 percent of the 1Q10 may be used for calculating acute and chronic wasteload allocations (WLAs). A copy of the print out from the MIXER run is enclosed in **Attachment G**.

B. **Outfall 001 (Process Water)**

(1) Technology / Effluent Guideline Based Limits and Monitoring

Flow -- The previous permit requirement for continuous flow monitoring has been continued. The table below compares the long term averages and 30 day maximum averages submitted on the VPDES permit reissuance applications. The 30 day maximum average flow given in the 2008 application was used in the wasteload allocation calculations for this permit. The maximum daily value 1.12 MGD from the 1998 and 2003 applications has not changed.

Application Submittal	30- day Maximum Average Flow (MGD)	Long Term Average Flow (MGD)
1998 application	0.81	0.63
2003 application	0.82	0.44
2008 application	0.93	0.42

Cobalt, Dissolved -- Since water quality criteria have not been established for cobalt, limitations have not been established. However, cobalt has been associated with effluent toxicity. Therefore, dissolved cobalt monitoring shall continue to be required using 24-hour composite samples. The monitoring frequency shall be increased to monthly for 5 months to characterize the wastewater discharge which may vary from month to month due to changes in production of the different products. The monthly monitoring will be conducted in accordance with the whole effluent toxicity characterization study in Part I.C.14. Then the monitoring frequency will be quarterly as noted in Part I.A. During months that toxicity testing is conducted the cobalt sampling shall be conducted during the toxicity testing event. During the December 2007 toxicity test, the cobalt concentration ranged from <5 µg/L to 19 µg/L. Due to this wide variance, the concentration of each of the samples used for the toxicity test shall be determined and the monthly average and maximum reported on the discharge monitoring report.

Iron, Total Recoverable -- A best engineering judgment (BEJ) technology based limit of 1.0 mg/L for maximum daily average concentration of total recoverable iron has been continued from the previous permit. The water quality criteria for iron are applicable only for public water supply segments. Monitoring shall continue once per month using 24-hour composite samples.

Sodium, Total -- No limit is given for sodium. Monitoring shall continue to be required using 24-hour composite samples. The monitoring frequency shall increase to monthly for 5 months to characterize the wastewater discharge which may vary from month to month due to changes in production of the different products. The monthly monitoring will be conducted in accordance with the whole effluent toxicity characterization study in Part I.C.14. Then the monitoring frequency will be quarterly as noted in Part I.A. During months that toxicity testing is conducted the sodium sampling shall be conducted during the toxicity testing event. Due to the wide variability of wastewater characteristics, the concentration of each of the samples used for the toxicity test shall be determined and the monthly average and maximum reported on the discharge monitoring report.

Sulfate -- There are no limits given for sulfate because this parameter is only applicable to public water supply stream segments. Sampling shall continue to be

required using 24-hour composite samples to be conducted during toxicity testing events. Since any high sulfate process wastewater is routed to the wastewater treatment system, the sulfate monitoring frequency has been increased to once per month for 5 months. The monthly monitoring will be conducted in accordance with the whole effluent toxicity characterization study in Part I.C.14. Then the monitoring frequency will be quarterly as noted in Part I.A. During months that toxicity testing is conducted the sulfate sampling shall be conducted during the toxicity testing event. Due to the wide variability of wastewater characteristics, the concentration of each of the samples used for the toxicity test shall be determined and the monthly average and maximum reported on the discharge monitoring report.

Total Dissolved Solids (TDS) -- Monitoring shall continue to be required using 24-hour composite samples. The monitoring frequency shall be monthly for 5 months to characterize the wastewater discharge which may vary from month to month due to changes in production of the different products. The monthly monitoring will be conducted in accordance with the whole effluent toxicity characterization study in Part I.C.14. Then the monitoring frequency will be quarterly as noted in Part I.A. During months that toxicity testing is conducted the total dissolved solids sampling shall be conducted during the toxicity testing event. Due to the wide variability of wastewater characteristics, the concentration of each of the samples used for the toxicity test shall be determined and the monthly average and maximum reported on the discharge monitoring report.

Total Suspended Solids (TSS) -- The TSS limitations of 30 mg/L monthly average and 45 mg/L maximum daily average will continue in the reissued permit. These limits are based on best engineering judgement (BEJ) and are in accordance with the previous permit limits. The loadings for TSS of 136 kg/d monthly average and 204 kg/d maximum daily average are based upon a projected flow of 1.2 MGD derived from the 1984 permit issuance. Since the maximum 30-day average flow reported on the permit application was 0.93 MGD, below this projection, the loadings have not been adjusted. Based upon the TSS monitoring frequency for other industrial facilities (eg., water treatment plants), the monitoring frequency of once per month has been continued using 24-hour composite samples.

- (2) Water Quality Based Limits and Monitoring: The discharge must be evaluated to determine whether there is a reasonable potential for the effluent to violate the water quality standards (WQSs) adopted by the State Water Control Board (9 VAC 25-260 et. seq). Toxic pollutant data collected during the permit term and on the application were above the quantification levels for ammonia, dissolved cobalt, and dissolved zinc. These data are summarized in **Attachment D**. Of these parameters, water quality criteria have been established for ammonia and dissolved zinc. As discussed below, the current permit already has limits for zinc.

Ammonia as Nitrogen -- The water quality criteria and wasteload allocations (WLAs) were calculated and are included in the spreadsheet in **Attachment G**. The acute and chronic WLAs and the effluent data for ammonia were entered into the Agency's STATS program to determine if limits are necessary for ammonia as nitrogen. The program output indicates that permit limits are not necessary for ammonia. Since one of the data points was greater than the chronic wasteload allocation, monthly ammonia monitoring via 24-hour composite samples for twelve months has been included in the permit to evaluate whether there is a potential to exceed the ammonia wasteload allocation. See **Attachment G** for a copy of the STATS program output for ammonia.

Chromium, Total Recoverable -- According to the 1999 permit application, chromium may be detected in raw materials as trace contaminants. The effluent concentration limitations of 74 µg/L monthly average and 1500 µg/L maximum daily average for total chromium have been continued from the previous permit. These limits are based upon the old water quality criteria in effect when the permit was issued in 1984. The limits can not be removed because backsliding due to a change in regulation is prohibited as stated in Section 402(o)(2)(B)(i) of the Clean Water Act. The monitoring frequency will continue to be once per month using 24-hour composite samples.

Copper, Total Recoverable -- The previous permit included total recoverable copper limitations. According to the 1999 permit application, copper may be detected in raw materials as trace contaminants. Discharge monitoring report data collected during the permit term were significantly below the permit limits. The limits are based upon the old water quality criteria in effect when the permit was reissued in 1984 reissuance permit. The permittee reported a maximum daily total recoverable copper concentration of 23 µg/L on the 1994 permit application and 12 µg/L on the 1999 permit application.

The limits can not be removed because backsliding due to a change in regulation is prohibited as stated in Section 402(o)(2)(B)(i) of the Clean Water Act. However, the limits may be made more stringent due to more stringent water quality criteria. The copper water quality criteria changed since the last reissuance. The current wasteload allocation and a value to force a limit were entered into the STATS program to determine if more stringent effluent limitations are needed. The program output indicated that limitations of 18 µg/L monthly average and 18 µg/L maximum daily average are needed. See **Attachment G** for a copy of the STATS program output for total recoverable copper. The previous permit limitations of 11 µg/L monthly average and 16 µg/L maximum daily average were more stringent and therefore have been continued. In accordance with the current VPDES Permit Manual, the monitoring frequency of once per month using 24-hour composite samples will continue.

pH -- The pH limitations of 6.0 S.U. minimum and 9.0 S.U. maximum have been continued from the previous permit. These limitations are in accordance with the Water Quality Standards in 9 VAC 25-260-50 for this Class IV receiving stream. Continuous pH monitoring will be continued from the previous permit. Continuous monitoring is required due to the potential for pH fluctuations within the system and the susceptibility of the receiving stream to pH fluctuations during low flow conditions. In accordance with 40 CFR 401.17, excursions are allowed where continuous pH monitoring is required. The total time during which pH values are outside the required range shall not exceed 446 minutes in any calendar month and no individual excursion from the range of pH values shall exceed 60 minutes.

Temperature -- As designated in 9 VAC 25-260-310, this segment of Peak Creek is protected by a special standard which limits temperature to 29 °C. This outfall includes noncontact cooling water, so the limit has been continued from the previous permit. Based upon the recommended monitoring frequency for similar industrial facilities with noncontact cooling water, the monitoring frequency has been continued at once per month.

Whole Effluent Toxicity (WET) Limit -- The chronic Whole Effluent Toxicity limit of 2.73 TU_c (based on a NOEC of 37% and an IWC of 45%) will be continued from the previous permit. Monthly acute and chronic toxicity testing using Ceriodaphnia dubia and Pimephales promelas will be required for 5 months. This increased frequency will provide a characterization of any changes in toxicity that may have occurred as a result of process waste stream flow modifications. Then, quarterly chronic toxicity testing using the most sensitive species will be required. See **Attachment H** for the 1994 WET Limit Determination Memorandum and a summary of the whole effluent toxicity testing conducted during the current permit term.

Zinc, Total Recoverable -- According to the 1999 permit application, zinc may be detected in raw materials as trace contaminants. The previous permit included total recoverable zinc limitations of 50 µg/L monthly average and 160 µg/L maximum daily average. During the permit term there was one exceedance of the monthly average total recoverable zinc concentration (72.3 µg/L) in November of 2007. These limits are based upon the old water quality criteria in effect when the permit was issued in 1984. The limits can not be removed because backsliding due to a change in regulation is prohibited as stated in Section 402(o)(2)(B)(i) of the Clean Water Act. However, the limits may be made more stringent due to more stringent water quality criteria. Since the previous reissuance, the Water Quality Standards, 9 VAC 25-260, have been amended, and the zinc criteria have changed. The current wasteload allocation and a value to force a limit were entered into the STATS program to determine if more stringent effluent limitations are needed. The program output indicated that 150 µg/L monthly

average and 150 µg/L maximum daily average limitations are needed. See **Attachment G** for a copy of the STATS program output for total recoverable zinc.

To avoid backsliding, the current more stringent limitation of 50 µg/L monthly average has been continued. A more stringent maximum daily average of 150 µg/L has been included in the reissuance permit. Since, the permittee appears to be able to meet maximum daily average limit, there is no compliance schedule associated with this change. In accordance with the VPDES Manual, the monitoring frequency of once per month using 24-hour composite samples has been continued.

C. Outfalls 901 (Storm Water and Process Water)

This outfall is subject to storm water monitoring requirements for the following storm water general permit industrial sector specific monitoring category:

Sector C Chemical and Allied Products Manufacturing (Industrial Inorganic Chemicals Subcategory)
(Total Recoverable Aluminum, Total Recoverable Iron, and Total Nitrogen)

Flow -- Flow shall be estimated quarterly for the storm events sampled in conjunction with quarterly sampling parameters.

Aluminum (Total Recoverable), Iron (Total Recoverable), and Total Nitrogen -- In accordance with the Sector C storm water monitoring requirements, annual storm water monitoring for total recoverable aluminum, total recoverable iron, and total nitrogen have been included. Also, the maximum daily average limit of 1.0 mg/L for outfall 001 has been carried over to outfall 901.

Copper, Total Recoverable -- Annual monitoring via grab samples for total recoverable copper has been continued from the previous permit. Since the storm water from outfall 901 combines with process water from outfall 001, the maximum daily average limit of 16 µg/L for outfall 001 has been carried over to outfall 901 and continued from the previous permit.

Zinc, Total Recoverable -- Total recoverable zinc exceeded the current 160 µg/L final limit for one of the three data points. Therefore, the monitoring frequency has been increased to quarterly. Since the storm water from outfall 901 combines with process water from outfall 001, the revised maximum daily average limit of 150 µg/L for outfall 001 has been carried over to outfall 901.

Chromium (Total Recoverable), Total Suspended Solids, Temperature, pH --

Since this outfall consists of process water and storm water, limits and monitoring associated with outfall 001 have been carried over to this outfall. Annual monitoring via grab samples have been continued from the previous permit. Maximum daily average limits of 1500 µg/L for total recoverable chromium, 45 mg/L (204 kg/d) for total suspended solids, 29 °C maximum for temperature, and 6.0 S.U. minimum and 9.0 S.U. maximum for pH have been carried forward from outfall 001 and continued from the previous permit. These limits are intended to ensure that storm water commingling with the process water discharge remain in compliance with water quality criteria.

D. Outfalls 002, 003, 004 (Storm Water)

These outfalls are considered substantially identical so the monitoring requirements pertain to all three outfalls which will be monitored on a rotating basis beginning with outfall 002. These outfalls are subject to storm water monitoring requirements for the following storm water general permit industrial sector specific monitoring category:

Sector C Chemical and Allied Products Manufacturing (Industrial Inorganic Chemicals Subcategory)
(Total Recoverable Aluminum, Total Recoverable Iron, and Total Nitrogen)

Aluminum, Total Recoverable; Total Nitrogen -- Annual storm water monitoring for total recoverable aluminum and total nitrogen via grab samples has been included in accordance with Section C of the storm water monitoring requirement.

Flow -- Flow shall be estimated quarterly for the storm events sampled in conjunction with quarterly sampling parameters.

Copper, Total Recoverable -- Since a TMDL has been developed for copper, annual monitoring via grab samples is required. The total recoverable copper monitoring data will be measured against the decision criteria of 18 µg/L. If the data exceed the decision criteria, additional best management practices may be needed to reduce copper concentration attributed to the facility to below levels of concern.

Zinc, Total Recoverable; Flow -- Six of the seventeen data points for outfalls 002, 003 and 004 collected during the permit term were significantly above the decision criteria. Therefore, total recoverable zinc for outfalls 002, 003, and 004 via grab samples will continue on a quarterly basis to allow the permittee to more closely track progress reducing the zinc concentration below the decision criteria of 120 µg/L.

Iron, Total Recoverable -- Although there is a water quality standard for iron, it only applies to public water supply designated receiving streams. Peak Creek is not considered a public water supply segment so the water quality standard does not apply. The EPA

benchmark value for total recoverable iron is 1.0 mg/L. The average concentration of total recoverable iron reported for outfalls 002/003/004 was below the target value. In accordance with current permit guidance, annual monitoring via grab samples will be continued.

17. **Antibacksliding Statement:** Since there are no limitations less stringent than the previous permit, the permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.
18. **Compliance Schedule:** The permit does not include any compliance schedules.
19. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. **Compliance Reporting under Part I.A (Part I.B.1)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR Part 130, Water Quality Planning and Management, Subpart 130.4. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

B. **Notification Levels (Part I.B.2)**

Rationale: The special condition is required by VPDES Permit Regulation, 9 VAC 25-31-200A for all manufacturing, commercial, mining, and silvicultural discharges.

C. **Operations and Maintenance Manual Requirement (Part I.B.3)**

Rationale: The Code of Virginia Section 62.1-44.16, VPDES Permit Regulation, 9 VAC 25-31-190 E, and 40 CFR 122.41(e) require proper operation and maintenance of the permitted facility. Section 40 of the Clean Water Act requires the permittee to provide an opportunity for the State to review the operations of the treatment facility. Compliance with an approved manual ensures these requirements are met.

D. **Materials Handling/Storage (Part I.B.4)**

Rationale: VPDES Permit Regulation, 9 VAC 25-30-50 A, prohibits the discharge of any wastes into State waters unless authorized by permit. The Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste. State Water Control Law § 62.1-44.18:2 authorizes the Board to prohibit any

waste discharge that would threaten public health or safety, interfere with or be incompatible with treatment works or water use.

E. **Cooling Water and Boiler Additives (Part I.B.5)**

Rationale: Chemical additives may be toxic or otherwise violate the receiving stream water quality standards. Upon notification, the Regional Office can determine if this activity will warrant a modification to the permit.

F. **Nutrient Enriched Waters Reopener (Part I.B.6)**

Rationale: The Policy for Nutrient Enriched Waters (9 VAC 25-40-10 et seq.) allows reopening of permits for discharges into waters designated as nutrient enriched if total phosphorus and total nitrogen in a discharge potentially exceed specified concentrations. The policy anticipates that future total phosphorus and total nitrogen limits may be needed to control growth of aquatic plants.

G. **Continuous pH Excursions (Part I.B.7)**

Rationale: A continuous pH monitor is used on outfall 001. 40 CFR 401.17 allows for excursions of the limits under certain conditions. It also specifies the conditions under which violations occur.

H. **Treatment Works Closure Plan (Part I.B.8)**

Rationale: Closure of all or part of the facility must be done according to an approved plan to prevent the potential for any unauthorized discharges of pollutants and degradation of water quality as prohibited in 9 VAC 25-31-50. In the event that any part of the treatment system is taken offline, this condition requires that a closure plan be submitted for that unit.

I. **Instream Flow Monitoring (Part I.B.9)**

Rationale: This condition requires continuous flow monitoring below Nanochemonics's intake and implementation of a contingency plan should the flow drop below 1.5 MGD. The purpose of this condition is to ensure that an IWC of 45 percent is maintained. The WET limit for outfall 001 is based upon a 45 percent IWC, and this special condition ensures that this criterion is met. In accordance with 9 VAC 25-31-220D1.b, instream surveys may be used to characterize instream impacts and the reasonable potential for the discharge to cause or contribute to an instream excursion above a narrative or numeric criteria within a Virginia water quality standard. See **Attachment A** for a summary of minimum instream flow collected during the permit term, a discussion of instream monitoring requirements, and a compilation of measures taken to comply with these requirements.

J. Qualitative Benthic Macroinvertebrate Study (Part I.B.10)

Rationale: State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. This condition requires annual benthic macroinvertebrate instream studies to determine if corrective actions taken by Nanochemonics to reduce toxicity also aid in the recovery of the benthic population. As noted in **Attachment F**, the 2007 benthic data indicate moderate instream affects downstream of the process outfall. Therefore, this special condition has been continued from the previous permit. In accordance with 9 VAC 25-31-220D1.b instream studies may be used to characterize the reasonable potential for the discharge to cause or contribute to an instream excursion above a narrative or numeric criteria within a Virginia water quality standard.

The study protocol shall use the most recent benthic evaluation methods currently found in the EPA publication, "Rapid Bioassessment Protocols for Use in Streams and Rivers," 2nd edition, July 1999 (EPA 841-B-99-002). In the event of EPA revisions to these methods, the study plan shall be amended to use the revised version. The classification of organisms as sensitive or tolerant shall be in accordance with current EPA guidance and supercede any previous out-of-date Agency guidance. The study shall be conducted between August 15 and December 1. The annual benthic macroinvertebrate study report shall be due on the following dates: 3/10/09, 3/10/10, 3/10/11, 2/10/12.

K. Storm Water Management Evaluation (Part I.B.11)

Rationale: The Clean Water Act 402(p)(2)(B) requires permits for storm water discharges associated with industrial activity. VPDES permits for storm water discharges must establish Best Available Technology / Best Conventional Technology (BAT/BCT) requirements in accordance with 402(p)(3) of the Act. The Storm Water Pollution Prevention Plan is the vehicle proposed by EPA in the NPDES Baseline Industrial Storm Water General Permit (published in the Federal Register 09/09/92) to meet the requirements of the Act. Additionally, the VPDES Permit Regulation, 9 VAC 25-31-220K and 40 CFR 122.44(k) allow best management practices (BMPs) for the control of toxic pollutants listed in Section 307 (a) (1), and hazardous substances listed in Section 311, of the Clean Water Act, where numeric limits are infeasible or BMPs are needed to accomplish the purpose/intent of the law.

As discussed in Section 16 of this Fact Sheet, the effectiveness of the SWPPP to reduce zinc and any other pollutant will be measured against the decision criteria. An annual report is to be submitted to the Regional Office and shall include all storm water data collected the previous calendar year and the status of the Storm Water Pollution Prevention Program. Previous best management practices implemented at the facility did not result in adequate reduction in zinc concentration of storm water. The facility is required to implement any applicable additional best management practices to reduce the zinc concentration attributed to the facility to below levels of concern.

J. Qualitative Benthic Macroinvertebrate Study (Part I.B.10)

Rationale: State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. This condition requires annual benthic macroinvertebrate instream studies to determine if corrective actions taken by Nanochemonics to reduce toxicity also aid in the recovery of the benthic population. As noted in **Attachment F**, the 2007 benthic data indicate moderate instream affects downstream of the process outfall. Therefore, this special condition has been continued from the previous permit. In accordance with 9 VAC 25-31-220D1.b instream studies may be used to characterize the reasonable potential for the discharge to cause or contribute to an instream excursion above a narrative or numeric criteria within a Virginia water quality standard.

The study protocol shall use the most recent benthic evaluation methods currently found in the EPA publication, "Rapid Bioassessment Protocols for Use in Streams and Rivers," 2nd edition, July 1999 (EPA 841-B-99-002). In the event of EPA revisions to these methods, the study plan shall be amended to use the revised version. The classification of organisms as sensitive or tolerant shall be in accordance with current EPA guidance and supercede any previous out-of-date Agency guidance. The study shall be conducted between August 15 and December 15. The annual benthic macroinvertebrate study report shall be due on the following dates: 3/10/09, 3/10/10, 3/10/11, 2/10/12.

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As discussed in Section 16 of this Fact Sheet, the effectiveness of the SWPPP to reduce zinc and any other pollutant will be measured against the decision criteria. An annual report is to be submitted to the Regional Office and shall include all storm water data collected the previous calendar year and the status of the Storm Water Pollution Prevention Program. Previous best management practices implemented at the facility did not result in adequate reduction in zinc concentration of storm water. The facility is required to implement any applicable additional best management practices to reduce the zinc concentration attributed to the facility to below levels of concern.

L. **Total Maximum Daily Load (TMDL) Reopener (Part I.B.12)**

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

M. **Form 2F Storm Water Sampling (Part I.B.13)**

Rationale: In some cases, applicants may not have been able to comply with the Form 2F storm water sampling requirements due to the lack of a representative storm event. This special condition requires the permittee to sample and submit data from a storm event to fulfill the requirements of Form 2F.

N. **Whole Effluent Toxicity Characterization Study (Part I.B.14)**

Rationale: This special condition provides whole effluent toxicity data to recharacterize the effluent. Five additional monthly toxicity tests using Ceriodaphnia dubia and Pimephales promelas are needed to evaluate whether the effluent is toxic to the aquatic organisms. Total dissolved solids, total sodium, sulfate, and dissolved cobalt monthly monitoring has been required in conjunction with the whole effluent toxicity testing. The most sensitive species identified in this study will be used in future quarterly toxicity testing.

O. **Whole Effluent Toxicity Limitation and Monitoring Requirements (Part I.C)**

Rationale: In accordance with 9 VAC 25-31-220D, the WET limitation has been continued from the previous permit. This limitation was established because the effluent demonstrated a reasonable potential to cause instream toxicity. The facility shall continue chronic monitoring for outfall 001 but at an increased frequency of monthly for five months. Following completion of five months of valid data, sampling may be reduced to quarterly. See **Attachment H** for the 1994 WET limit determination calculations and a summary of toxicity test data collected during the permit term.

P. **General Storm Water Special Conditions (Part I.D)**

Rationale: This requirement is based upon the VPDES Permit Regulation, 9 VAC 25-31-120B which requires that quantitative data be provided for storm water discharges associated with industrial activity. Visual quarterly inspections are required for outfalls associated with industrial activity. These requirements are taken from the VPDES

general permit for discharges of storm water associated with industrial activity, 9 VAC 25-151-10 et seq.

Q. Storm Water Pollution Prevention Plan (Part I.E)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-10 defines discharges of storm water from industrial activity in 9 industrial categories. 9 VAC 25-31-120 requires a permit for these discharges. The Storm Water Pollution Prevention Plan requirements of the permit are derived from the VPDES general permit for discharges of storm water associated with industrial activity, 9 VAC 25-151-10 et seq. VPDES Permit Regulation, 9 VAC 25-31-220K, requires use of best management practices where applicable to control or abate the discharge of pollutants when numeric effluent limits are infeasible or the practices are necessary to achieve effluent limits or to carry out the purpose and intent of the Clean Water Act and State Water Control Law.

R. Conditions Applicable to All VPDES Permits (Part II)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

20. NPDES Permit Rating Worksheet: Total Score: 85

In accordance with the VPDES Permit Manual, the NPDES Permit Rating Worksheet has been completed, and this facility has been classified as an industrial major. The completed worksheet is found in **Attachment I**.

21. Changes to Permit:

A. Permit Limits and Monitoring Requirements: See Table III on pages 29-30 for details on changes to the effluent limitations and monitoring requirements.

B. The following special condition has been deleted from the permit:

The Schedule of Compliance (Part I.B) has been deleted from the permit because the final total recoverable zinc limit is effective.

C. Special conditions that have been modified from the previous permit are listed below: (The referenced permit sections are for the new permit.)

1. The Compliance Reporting under Part I.A Special Condition (Part I.B.1) has been revised to include information about significant figures.
2. The Operations and Maintenance Manual Special Condition (Part I.B.3) has been revised in accordance with the VPDES Permit Manual.

3. The Whole Effluent Toxicity Limitation Special Condition (Part I.C) has been revised to increase the frequency of monitoring.
4. The Storm Water Prevention Plan Special Condition (Part I.E) has been revised in accordance with the VPDES Permit Manual.
5. In accordance with the VPDES Permit Manual, boilerplate permit pages (Part II) have been revised to reflect changes in the VPDES permit regulations regarding signatory requirements.

D. **The following new special conditions added to the permit are listed below:**

1. A Cooling Water and Boiler Additives Special Condition (Part I.B.5) has been added to require the permittee to notify DEQ of any cooling water or boiler additives.
2. A Form 2F Storm Water Sampling Special Condition (Part I.B.13) has been added since the permittee was not able to complete the storm water sampling prior to submission of the VPDES permit application.
3. A Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) has been added to recharacterize outfall 001.

22. **Variances/Alternate Limits or Conditions:** No variances or alternate limits or conditions are included in this permit. The 2003 application waiver, approved to allow the submission of dissolved metals data in lieu of total recoverable metals data, has been carried forward for this permit revocation and reissuance. This waiver is appropriate because water quality standards are written for dissolved metals rather than total recoverable metals.

23. **Public Notice Information required by 9 VAC 25-31-280 B:**

All pertinent information is on file and may be inspected or copied by contacting Becky L. France at:

Virginia DEQ, West Central Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
blfrance@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant.

Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the DEQ will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. See **Attachment J** for a copy of the public notice.

24. **303(d) Listed Segments (TMDL):** This facility discharges directly to Peak Creek. The stream segment receiving the effluent is listed for nonattainment of copper, zinc, E. coli, PCBs in fish tissue, and benthic impairment. Refer to **Attachment E** for an excerpt from the TMDL report and Agency guidance regarding TMDLs. TMDLs for copper and zinc have been prepared and approved for the segment. This permit has total recoverable copper limits of 11 µg/l monthly average and 16 µg/l maximum daily average and total recoverable zinc limits of 50 µg/l monthly average and 160 µg/l maximum daily average for outfall 001. The facility is required to implement best management practices to prevent the storm water discharge of copper and zinc in excess of the decision criteria established in section 16 of this Fact Sheet. A chronic toxicity limit of 2.73 TU_c and instream benthic monitoring have also been included in the permit. No limit for PCBs is included in this permit because the VPDES permit application indicates that PCBs are not believed present in the effluent.

25. **Additional Comments:**

- A. **Reduced Effluent Monitoring:** In accordance with Guidance Memorandum 98-2005, all permit applications received after May 4, 1998, are considered for reduction in effluent monitoring frequency. Only facilities having exemplary operations that consistently meet permit requirements may qualify for reduced monitoring. To qualify for consideration of reduced monitoring requirements, the facility should not have been issued any Warning Letters, Notices of Unsatisfactory Laboratory Compliance, Letter of Noncompliance (LON) or Notices of Violation (NOV), or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

This facility received the following Warning and NOV letters within the past three years:

Warning No. W2008-03-W-1001	chronic toxicity limit exceedance
Warning No. W2008-01-W-1001	pH and zinc exceedances
Warning No. W2007-11-W-1023	failure to report zinc, copper, and chromium
NOV No. W2006-11-0003	failure to submit complete revisions of SWPPP
NOV No. W2006-10-W-0002	failure to submit revisions of SWPPP
Warning No. W2006-W-1022	Prochem Analytical lab inspection deficiencies

Warning No. W2006-07-W-1007

Warning No. W2005-09-W-1011

Warning No. W2005-03-W-1007

failure to report spill on DMR
 failure to properly store samples collected
 for WET testing, zinc exceedance,
 unauthorized discharge
 failure to submit annual progress report
 regarding zinc, pH exceedance

The facility does not meet the criteria discussed above and therefore is not eligible for reduced monitoring.

- B. **Previous Board Action:** Nanochemonics entered into an accelerated Toxicity Reduction Evaluation (TRE) under an Order by Consent executed on May 28, 1998. Toxicity testing under the schedule for this order was completed during a previous permit term.
- C. **Staff Comments:** The discharge is not controversial. The discharge is not included in the existing planning document for the area, but will be included, if applicable, when the plan is updated. The permit is being reissued for a period of less than five years to even out the DEQ staff permit writing workload.
- D. **Public Comment:** (to be determined)
- E. **Tables:**
- | | |
|-----------|--|
| Table I | Discharge Description (Page 2) |
| Table II | Basis for Effluent Limitations (Pages 26-28) |
| Table III | Permit Processing Change Sheet (Pages 29-30) |
- F. **Attachments:**
- A. Stream Flow Determination and Monitoring
 - Flow Frequency Memorandum
 - Contingency Plan Memorandum
 - Flow Contingency Plan
 - B. Maps and Diagrams
 - Flow Diagram
 - Water Balance Diagram
 - Site Map
 - Topographic Map
 - C. Site Inspection Reports and Process Description Summary
 - D. Facility Discharge Data
 - Effluent Data
 - Storm Water Data
 - 1992 Approval Letter for Substantially Identical Outfalls

- E. Ambient Stream Data
 - Peak Creek Instream Data (9-PKC011.11)
 - Integrated 2004 Water Quality Assessment Summary (Excerpt)
 - 2006 Impaired Waters Fact Sheet (Excerpt)
 - Fecal Bacteria and General Standard Total Maximum Daily Load Development for Peak Creek Report (Excerpt)
- F. Benthic Stream Data
 - 1994 Fact Sheet Antidegradation Analysis (Excerpt)
 - Study Protocol for Annual Benthic Macroinvertebrate Study of Peak Creek 8/10/00 Revision (Excerpt)
 - 1999 -2007 Annual Benthic Biomonitoring Report Summaries
- G. Wasteload and Limit Calculations
 - MIXER Program Output
 - Wasteload Allocation Spreadsheet
 - STATS Program Outputs (ammonia, copper, zinc)
- H. Whole Effluent Toxicity Test Memorandums
 - 1994 WET Limit Determination
 - WET Limit Compliance Review Memorandum
 - Permittee Toxicity Evaluations
- I. NPDES Permit Rating Worksheet
- J. Public Notice
- K. EPA Checksheet

Table II -1
BASIS FOR EFFLUENT LIMITATIONS

OUTFALL: 001
SIC CODE: 2816

() Interim Limitations
(x) Final Limitations

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH (Standard Units)	3	NA	NA	6.0	9.0	1/Day	Grab
Total Suspended Solids	2	30 mg/L 136 kg/d	NA	NA	45 mg/L 204 kg/d	1/Month	24 HC
Sulfates	2	NL mg/L	NA	NA	NL mg/L	1/3 Months**	24 HC
Ammonia as Nitrogen	3	NL mg/L	NA	NA	NL mg/L	1/Month*	24 HC
Temperature	3	NA	NA	NA	29 °C	1/Month	IS
Total Dissolved Solids	2	NL mg/L	NA	NA	NL mg/L	1/3 Months**	24 HC
Total Sodium	2	NL mg/L	NA	NA	NL mg/L	1/3 Months**	24 HC
Zinc, Total Recoverable	3,4	50 µg/L	NA	NA	150 µg/L	1/Month	24 HC
Copper, Total Recoverable	4	11 µg/L	NA	NA	16 µg/L	1/Month	24 HC
Chromium, Total Recoverable	4	74 µg/L	NA	NA	1500 µg/L	1/Month	24 HC
pH - Total Excursions -- Time	1	NA	NA	NA	446 min.	Continuous	Recording
pH - Individual Excursions -- Time	1	NA	NA	NA	60 min.	Continuous	Recording
Iron, Total Recoverable	2	NL mg/L	NA	NA	1.0 mg/L	1/Month	24 HC
Whole Effluent Toxicity (TU _c)	3	NA	NA	NA	2.73 TU _c	1/3 Months**	24 HC
Cobalt, Dissolved	2	NL µg/L	NA	NA	NL µg/L	1/3 Months**	24 HC

NA = Not Applicable NL = No Limitations; monitoring only 24 HC = 24 hour Composite IS = Immersion Stabilization * = 1/month for 12 months **See Part 1.B.15 for additional requirements.
TIRE = totalizing, indicating, recording equipment

The basis for monitoring and/or limitations are:

1. Federal Effluent Guidelines (40 CFR 140.17)
2. Best Engineering Judgment
3. Water Quality Standards
4. Other - Water Quality Criteria for 1984 Permit
5. TMDL Loading Report

Table II -2
BASIS FOR EFFLUENT LIMITATIONS

OUTFALL: 901
SIC CODE: 2816

() Interim Limitations
(x) Final Limitations

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
pH (S.U.)	3	NA	NA	6.0	9.0	1/Year	Grab
Total Suspended Solids	2	NA	NA	NA	45 mg/L, 204 kg/d	1/Year	Grab
Nitrogen, Total (mg/L)	5	NA	NA	NA	NL	1/Year	Grab
Temperature	3	NA	NA	NA	29 °C	1/Year	IS
Zinc, Total Recoverable	3	NA	NA	NA	150 µg/L	1/3 Months	Grab
Flow Precipitation Event (MG)	NA	NA	NA	NA	NL	1/3 Months	Estimate
Copper, Total Recoverable	4	NA	NA	NA	16 µg/L	1/Year	Grab
Chromium, Total Recoverable	4	NA	NA	NA	1500 µg/L	1/Year	Grab
Iron, Total Recoverable	2,5	NA	NA	NA	1.0 mg/L	1/Year	Grab
Aluminum, Total Recoverable (µg/L)	5	NA	NA	NA	NL	1/Year	Grab

NA = Not Applicable
NL = No Limitations; monitoring only
1/Year= Once every 12 months
IS = Immersion Stabilization

The basis for monitoring and/or limitations are:

1. Federal Effluent Guidelines;
2. Best Professional Judgment
3. Water Quality Standards
4. Other—Water Quality Criteria for 1984 Permit
5. Sector C - Chemical and Allied Products Manufacturing (Storm Water General Permit Regulation)
6. Exceeded Storm Water Screening Criteria

Table II -3
BASIS FOR EFFLUENT LIMITATIONS

OUTFALL: 002, 003, 004
SIC CODE: 2816

() Interim Limitations
(x) Final Limitations

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
pH (Standard Units)	4	NA	NL	NA	NL	1/Year	Grab
Nitrogen, Total (mg/L)	4	NA	NA	NA	NL	1/Year	Grab
Zinc, Total Recoverable (µg/L)	5,6	NA	NA	NA	NL	1/3 Months	Grab
Flow Precipitation Event (MG)	NA	NA	NA	NA	NL	1/3 Months	Estimate
Copper, Total Recoverable (µg/L)	6	NA	NA	NA	NL	1/Year	Grab
Iron, Total Recoverable (mg/L)	4	NA	NA	NA	NL	1/Year	Grab
Aluminum, Total Recoverable (µg/L)	4	NA	NA	NA	NL	1/Year	Grab

NA = Not Applicable

NL = No Limitations; monitoring only

1/Year= Once every 12 months

1/3 Month = Once every 3 months

The basis for monitoring and/or limitations are:

1. Federal Effluent Guidelines
2. Best Professional Judgment
3. Water Quality Standards
4. Sector C - Chemical and Allied Products Manufacturing (Storm Water General Permit Regulation)
5. Exceeded Storm Water Screening Criteria
6. Total Maximum Daily Loading Report

Table III
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Ammonia as Nitrogen	NA	1/Month for 12 months			Ammonia as nitrogen monitoring added to assess if limits are needed.	5/16/08
001	Sodium, Total	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Total Dissolved Solids	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Sulfate	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Dissolved Cobalt	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Zinc, Total Recoverable			50 µg/L monthly average; 160 µg/L maximum daily average	50 µg/L monthly average; 150 µg/L maximum daily average	More stringent water quality criteria became effective. STATS program output indicated a more stringent maximum daily average limit was needed.	4/10/08
001	Whole Effluent Toxicity	1/3 Months	1/Month for 5 months then 1/3 Months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08

Table III
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Ammonia as Nitrogen	NA	1/Month for 12 months			Ammonia as nitrogen monitoring added to assess if limits are needed.	5/16/08
001	Sodium, Total	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.15) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Total Dissolved Solids	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.15) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Sulfate	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.15) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Dissolved Cobalt	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.15) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Zinc, Total Recoverable			50 µg/L monthly average; 160 µg/L maximum daily average	50 µg/L monthly average; 150 µg/L maximum daily average	More stringent water quality criteria became effective. STATS program output indicated a more stringent maximum daily average limit was needed.	4/10/08
001	Whole Effluent Toxicity	1/3 Months	1/Month for 5 months then 1/3 Months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.15) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08

Table III-1
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Ammonia as Nitrogen	NA	1/Month for 12 months			Ammonia as nitrogen monitoring added to assess if limits are needed.	5/16/08
001	Sodium, Total	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Total Dissolved Solids	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Sulfate	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Dissolved Cobalt	1/3 Months	1/Month for 5 months then 1/3 months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08
001	Zinc, Total Recoverable			50 µg/L monthly average; 160 µg/L maximum daily average	50 µg/L monthly average; 150 µg/L maximum daily average	More stringent water quality criteria became effective. STATS program output indicated a more stringent maximum daily average limit was needed.	4/10/08
001	Whole Effluent Toxicity	1/3 Months	1/Month for 5 months then 1/3 Months			Whole Effluent Toxicity Characterization Study Special Condition (Part I.B.14) requires 1/month for 5 months. Part I.A continues to require 1/3 month frequency.	10/16/08

Table III-2
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
002, 003, 004	Copper, Total Recoverable	NA	1/ Year	NA	NL µg/L	Monitoring added to provide data to determine if decision criteria met for discharge into water quality segment that is impaired due to copper.	10/29/08
901	Flow	1/Year	1/3 Months			Monitoring frequency increased to provide storm event flow estimation for the additional monitoring required for zinc.	4/10/08
901	Zinc, Total Recoverable	1/Year	1/3 Months	160 µg/L maximum daily average	150 µg/L maximum daily average	More stringent water quality criteria became effective. STATS program output indicated a more stringent maximum daily average limit was needed. Monitoring frequency increased to provide data to calculate annual TMDL loading limit.	4/10/08